The Excavating Engineer

Vol. 18 SEPTEMBER 1924 No. 9

The Sutlej Valley Irrigation Project in India

Description of an Enormous Irrigation Project Covering an Area as Large as the State of New Hampshire and Involving as Much Excavation as that of the Panama Canal

PROVERBIAL is the wealth of India. Few among us have not had our imaginations gripped by tales of the lavish splendors of the Courts of the Great Moguls, or of the huge fortunes amassed by Maharajahs and other potentates, to be spent on every conceivable form of luxury. The very name India brings to the western mind thoughts of diamonds and other gems, of jewel bedecked elephants, of the rustle of silks and the tinkle of gold and silver ornaments behind pierced marble screens, of peacocks strutting through moonlit gardens, of air soft with the fragrance of moghra blossoms and scented fountains, and of other things that stir a faint unrest in the bosoms of men engrossed in the commercialism of our Western World.

What is the source of this vast opulence that, centuries ago, tempted venturesome traders from Western shores, and led to the formation of those great militaristic commercial enterprises, which so changed the destinies of this distant land? It was the soil of India; for India, being primarily an agricultural country, depends, more than most countries, on its soil for its prosperity. All this magnificence was derived from the efforts of the humble peasant, ceaselessly laboring with primitive tools, and praying to his countless gods for that all important blessing — rain.

The soil of most of India is extremely fertile if it can be supplied with water; but the rains occur only during the relatively short period of the Monsoons, those fierce storms that annually sweep over India, pouring down upon it a deluge that drives all living things to shelter. During the rest of the year very little rain falls; and it is then that the peasant must toil endlessly to supply to his land, by artificial means, the moisture that is essential to his crops, and therefore to his life. Sometimes the Monsoon fails; and then famine and pestilence take their heavy toll.

Many and ingenious are the methods used to bring water to the land. Most of them depend on the efforts of men or of bullocks; but even in centuries past the more elaborate systems of irrigation were not unknown. More recently the British Government, and the rulers of the more progressive native states, have given much thought to this problem. Vast irrigation schemes of the most modern kind have been undertaken, in order that the population may be free from the fear of famine, and that the land may more surely produce the wealth which, through its great natural fertility, it is potentially capable of producing.

The Punjab

One of the most fertile parts of India is the broad level northern plain, lying within the political and administrative division known as the Punjab. So fair and prosperous is this plain that, from time immemorial, it has tempted wild marauding hordes to sweep down from the mountains to the Northwest, and to rob and plunder, until, beaten back less by man than by the scorching summer heat, they withdrew whence they came, but laden with booty and leaving behind them a ravaged country and a stricken populace. Here, too, the Mogul Emperors in the height of their power constructed many of their lovely palaces and pleasure gardens. The beauty of these today tempts other hordes to sweep across the ocean, to be, in their turn, plundered; until driven out by the fierce summer heat they return whence they came, laden with curios, and leaving behind them the same country but an enriched populace. On this plain have been fought most of the stirring battles, and have been enacted most of the deeds of valor, which are celebrated in the old folk songs sung at evening time in many a mud-walled hovel.

Through this plain, flow five rivers, converging in their courses until their waters unite to sweep to the sea in the great River Indus. In the valleys of two of these, the Sutlej and Chenab, is being constructed one of the largest of the new irriga-

Leaving the Camp Behind

In the Wake of the Caterpillar-Mounted Dragline

View of the Bucyrus Class-14 Dragline Showing the Method of Bringing Water to the Machine

The Treacherous Nature of the Desert Sand Was One of the Difficulties Encountered en Route

On Part of the Journey, Grass and Planking Were Used for Blocking the Caterpillars to Overcome Dangerous Ground Conditions

Crossing the Main Line Embankment of the Northwestern Railway, which is the Principal Railway System in the Punjab

The Surface of the Desert is Undulating and Several Steep Climbs Had to be Made

Views of One of the Bucyrus Class-14 Draglines Moving to the Site of Operations

tion projects. It is in this historic and romantic setting that American excavating machinery is assisting British engineers in making Indian land more productive and Indian people more certain of a healthful and prosperous existence.

Scheme of Irrigation

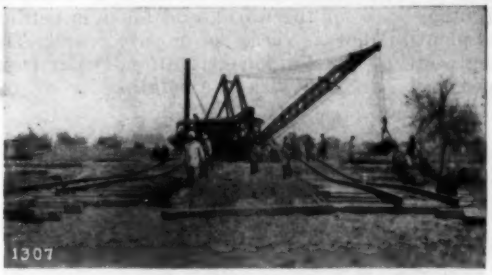
The territory to be benefitted by this development stretches to the southwest of Ferozepore for a distance of 300 miles along the left banks of the Sutlej, the Chenab and the Indus to the borders of Sind, and on the right bank of the Sutlej to the point where it joins the Chenab. An area of over 14,000 square miles will be irrigated. It is as though a project were being carried out to irrigate the entire state of New Hampshire. The portion of this area on the right bank of the Sutlej lies in British India, that on the left bank of the three rivers is within the independent native states ruled by the Maharajah of Bikaner and the Nawab of Bahawalpur. The work is being done under the direction of the Punjab Irrigation Department Engineers, supported jointly by the Punjab Government and by the two Ruling Princes. The revenues derived from the increased productivity of the soil will be shared by those who have paid for the construction.

An idea of the vastness of the undertaking will be gained from the fact that the volume of excavation will equal if not exceed that of the Panama Canal, and the total cost is estimated at 15 crores of rupees or approximately $47,000,000. It is hoped that the work will be completed in eight years, and that from five to six years thereafter it will have been paid for by increased land revenues, by water rates and by sales of land.

The Construction

Turning now to the details of the construction, four weirs are being built, three on the Sutlej River at Gandasinghwala, Sulemanke and Islam, and one on the Chenab at Panjnad, just below the junction of this river and the Sutlej. The weirs are of masonry and concrete, and will support piers fitted with stony sluice gates sixty feet in span and high enough for any stage of the river. The water will be conducted to the headworks of each canal by means of training works of the most approved type. Regulators of modern design in the headworks will exclude all excess silt from the canals.

The water from the sources of the Sutlej will be relied upon to supply all the canals during and following the rainy season. The maximum discharge of this river is 350,000 cusecs, and it is estimated that the maximum demand of the canals will be only approximately 48,500 cusecs. In the dry season reliance must be placed on the supplies of the Beas River, as this is the only one of the five rivers of the Punjab that is not already being used for irrigation purposes. It is known, however, that even under the worst condition there will be, with careful distribution, an ample supply of water for this project, without encroaching on the supplies required for the other large project now under construction farther down the Indus River.



Another View of the Bucyrus Class-14

System of Canals

Starting at the three headworks of the Sutlej there will be, in all, ten canal systems, each involving a main line canal and the usual series of secondary and distributing channels. Four of these systems will be on the right bank of the river in British territory and six on the left bank, one for British Territory, and the remaining five for the States of Bikaner and Bahawalpur. Three of the systems will be perennial, one partly perennial and partly non-perennial, and six non-perennial. One of the main-line canals leading off from the left bank at the Gandasinghwala headworks will be lined with concrete throughout its entire length of approximately 90 miles. This is being done at the request of the Maharajah of Bikaner, whose state will be irrigated by the water from this canal. An idea of the amount of concrete that will be required and the cost of laying it may be gained from the fact that the canal has a bottom width of 52 feet, with a wetted perimeter of 77 feet.

From the Panjnad headworks on the Chenab, two canal systems will be constructed, both on the left bank of the river and both in the native state of Bahawalpur. One will be perennial and the other non-perennial.

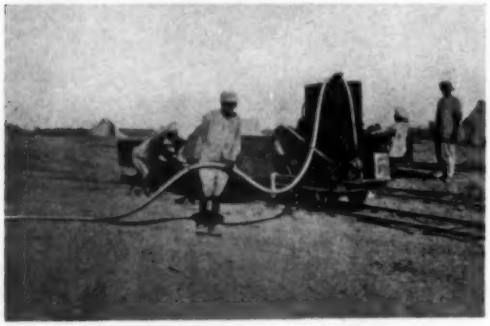
The sections of all the canals and the embankments will be accurately finished, and patrol roads will be maintained on both banks of the main-line canals.

The Excavation

When this great undertaking had been decided upon, the question arose as to the best and most economical method of doing the excavation

work. All of the many irrigation canal systems previously constructed in India had been done by coolie labor, except that one or two installations of an inferior type of excavating machinery had been attempted without success. It had, in fact, been more or less of a byword among engineers in India that no machinery could possibly compete with coolies on work of this sort.

However, conditions are changing in India as in other parts of the world, and labor is neither as plentiful nor as cheap as in past years. The engineers of the Punjab Irrigation Department were not satisfied with the infallibility of the



View Showing Portable Pumps which Deliver Water from the Tank Cars to the Machine

coolie labor hypothesis, and started a careful investigation of the results obtained with modern excavating machinery in other parts of the world where cheap labor exists. They finally decided on a rather extensive use of dragline excavators, partly on the theory that they would show some saving in unit cost of excavation, but also in the belief that they would be more reliable, that the danger of epidemics of cholera and dysentery would be decreased, and that the date of completion of the project could be figured with greater certainty.

Formal tenders were finally called through the India Store Department in the summer of 1922 and six dragline excavators were purchased. At a somewhat later date two more machines were added to these. The excavating equipment now consists of four Bucyrus dragline excavators (one Class-175, one Class-24 and two Class-14) and four machines of British manufacture. All the machines are steam driven and have specially designed boilers for use with coal of low calorific value. The booms are so designed that their lengths may be varied to suit varying widths of canal, and buckets of different sizes were supplied with each machine for application in accordance with the length of boom in use. The machines are equipped with electric lighting plants for night operation.

The Bucyrus Class-24 machine was erected near Ferozepore in May, 1923 and went to work on a section of the Bikaner Main Line Canal. As previously mentioned, this canal has a bottom width of 52 feet and will be lined with concrete throughout its entire length. This machine was at first fed by a 2-foot-gauge light railway, pending the laying of a meter-gauge line. Theoretically the machine works 18 hours per day, but actually there has been a considerable amount of lost time due to the difficulty of keeping it supplied with coal and water with the inadequate transportation facilities and also to the scarcity of competent operators. Even under these unfavorable conditions the machine has surprised its owners by its remarkable efficiency, and has convinced them that, in addition to the advantages which they expected of it, the work can actually be done with it at a lower unit cost than with coolie labor, even taking proper account of depreciation and interest charges. Before the end of the year it had achieved a maximum 18-hour output of 140,000 cubic feet. Its average operating cost, including interest and depreciation but excluding the labor necessary for embankment trimming, from the start of operations to the end of October, was Rupees 6, Annas 5 per 1000 cubic feet, corresponding to 5.6 cents per cubic yard. This included the early period before the work was fully organized and before any operators were properly trained, and the cost figures

Coaling the Machine in the Desert Is Done by Coolie Labor

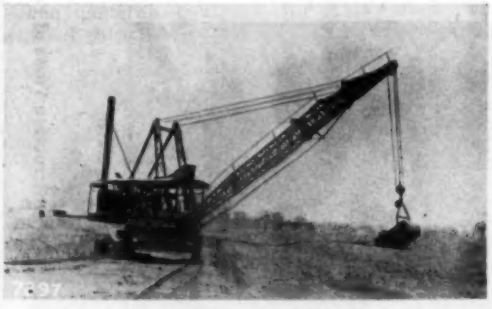
toward the latter part of this period were considerably lower, comparing most favorably with the cost of doing similar work by hand. The material consisted mainly of a light loam with occasional sand.

Immediately after their erection the two Bucyrus Class-14 machines started work on the excavation for the headworks at Sulemanke. The dimensions of the excavation were such that the machines were operating continuously at the limit of their working range. Nevertheless they have

given their owners complete satisfaction, and have established a very enviable reputation for themselves on this class of work. Subsequently one of these machines was transferred to the enlargement of an existing canal. This work had been started by coolie labor, an embankment being left between the old canal and the new excavation to keep water out of the latter. The task of the machine was to reach across the new excavation and remove the material left in this embankment, depositing it behind the machine on the new bank of the canal. Much of the work was done under water, and the average angle of swing was nearly 180 degrees. Even under these conditions the dragline, equipped with a 60-foot boom and 2-cubic-yard bucket, attained a maximum capacity of 85,000 cubic feet in an 18-hour day with the usual operating delays.

The cost of this operation, excluding depreciation, was as low as Rupees 4, Annas 4 per 1000 cubic feet, or not much more than half what it would have cost to do the same work by coolie labor, even had it been possible to overcome the obstacle furnished by the presence of water in the old canal.

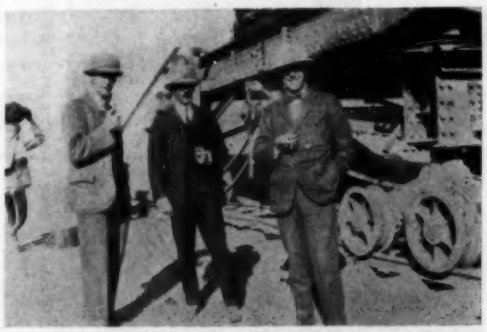
The Bucyrus Class-175 machine has only recently been completely erected, and will be put to work on one of the main-line canals where it will undoubtedly carry on the excellent record made by the other machines furnished by this company.



Another View of the Bucyrus Class-24

Of the four British machines one is not yet in operation, another began work early in February, 1924, and reports on it were not available when the material for this article was collected. The other two started working in the summer of 1923 at the Islam headworks, but have not been operating continuously enough to form a fair basis of comparison between the economy of mechanical and manual methods of excavation.

The successful application of the Bucyrus draglines to the excavation of the headworks and the larger canals has more than justified the progressive attitude of the engineers of this great project. Their pioneering, in what had previously been considered in India an experimental field, has proved that, even there, for large excavations, the far-famed coolie is no match for the modern machine of good design, if the machine is properly handled.



From Left to Right: Mr. Roys, Executive Engineer, P. W. D., Punjab; Mr. E. P. Hayward, Bucyrus Erecting Engineer and Mr. G. L. Bennet of Messrs. McLeod & Co., Calcutta.

In other countries where cheap labor abounds the same fact has been demonstrated; and it has even further been proved that this condition exists as well in small excavations, where the lead and lift are less. The Punjab engineers are to be congratulated on the success of their progressive step and the courage that inspired it. It will go a long way toward the more general use in India of these devices for other work of this nature. The coolie must now look to his laurels.

The Steam Shovel

Down in a pit by the long blue road
That comes from the canyons of steel
Browses the monster of grit and rock,
Wolfing his endless meal.

Grating his jaws on the living earth
With a thousand hisses and groans,
Wallowing low in the drab, dark muck,
Gorging the dirt and stones.

Up pours the steam of his burning breath
In geysers and billows white,
Down drops his head in the darkling depths,
Then up to the blazing light.

Weaving and twisting, the ponderous thing
Gouges the square pit out,
Down in the crater with creak and yell,
Up with the blast of a shout.

Endless and endless — a tireless brute —
The sun comes out of the East,
And wafts the last faint flame of him
Over the plodding beast.

Not since the dawn of the world began
Have the gods seen such as he —
Deliberate as a glacier moves,
As ceaseless as the sea.

— *Samuel M. Sargent, Jr.,*
Highway Builder.

View of the Bucyrus 20-B Digging Surfacing — the Gentleman in the Black Hat Standing on the Running Board is J. H. Bull

The Bucyrus 20-B ¾-Yard Shovel Loading into Ford Dump Truck

Rolling the Subgrade Preparatory to Spreading the Gravel

Some of the Trucks

Construction Views of Federal Aid Project No. 133

Federal Aid Work in Alabama

Description of Highway Work in Winston County, Alabama — Small Revolving Shovel Makes Rapid Headway on Work

RECENT reports from the South reveal the fact that Alabama will be saving its nickels for the future when it has completed its ambitious highway program. Over three million dollars will have been expended on roads alone in that state during its fiscal year ending in July, 1925. The State will dig down into its coffers for half of this amount while the Federal Government will pay the other half.

Alabama is one of the leading states in the construction of public roads, and according to the *United States Good Roads Bulletin* will rank third during the coming fiscal year in the amount of money received from the Federal Government. The only other states receiving more federal aid than Alabama are two of its sister states, Georgia and Tennessee.

One of the new highways under construction included in their present program is that of Federal Aid Project No. 133 which will connect Double Springs, the county seat of Winston County and Haleyville, twenty miles northwest. A modern highway with gravel top is rapidly supplanting the rocky and crooked road used between those two towns since the county was originally settled years ago.

The general contract for this work was awarded to Mr. W. C. McCoy of LaFayette, Alabama, who is well known in road-building circles in Alabama, and has a long list of successful contracts to his credit. The contract for the grading of this project was awarded to Burt & Crowley of Fort Payne, Alabama.

A Group of the Truck Drivers

The specifications call for a graveled roadway 16 feet in width laid with 9 inches of loose gravel. The total surfacing required approximates 50,000 yards — an average per mile of 2500 yards. The contract for loading and hauling the surfacing was awarded to J. H. Bull of Winfield, Alabama, when the grading had progressed far enough that 8 miles of subgrade was ready.

View of the Gravel Pit, Showing Bucyrus 20-B in Operation

With characteristic energy and a desire to handle his work as rapidly and cheaply as possible, Mr. Bull decided to buy a small revolving shovel for loading the surfacing. He finally decided upon the purchase of a Bucyrus 20-B ¾-yard shovel on caterpillars. Hauling is being done by a fleet of 30 trucks, the greater part of which are Fords equipped with one-yard end dump bodies. Two three-yard Federals and one three-yard Mack are also employed. The greater portion of these trucks are owned by nearby farmers, who haul gravel on a piece rate basis, depending on the length of haul and capacity of truck.

The Excavator

As soon as the Bucyrus 20-B arrived it was erected at Haleyville and moved under its own power to the first pit, a distance of five miles. It is expected that 8 miles of the new road will be supplied from this pit after which the shovel will be moved to a more convenient pit in order to reduce the haul as much as possible. The excavation was begun about June 15th, and at the time this is written had delivered enough material to surface 5 miles of road.

The amount loaded daily averaged close to 600 yards, never having been less than 600 yards; the best day being 678 yards. Mr. Bull is justly quite proud of this record, and in commenting on the performance of the shovel states that he has not had any shovel delays since it was put to work. Some delay, however, has been caused by the inability of the subgrading forces to prepare a place for the gravel.

Water for the shovel is obtained by means of a portable gasoline pump from a nearby spring. About one ton of coal per day is being used.

Mr. E. L. Miller, an old-timer in the Alabama coal fields, is handling the 20-B, assisted by Frank Ralston at the boiler. Jack C. Bull, one of Mr. Bull's sons, is getting his first shovel experience pulling the dump rope. Federal Aid Project No. 133 is under the supervision of Mr. H. D. Burnum, Division Engineer, with offices at Decatur, Alabama. Mr. L. D. Eystee is resident engineer, and Mr. D. Day is assistant resident engineer. We are indebted to Mr. Day for the above information.

At the extreme left is Frank Ralston, fireman, next is a son of J. H. Bull, J. H. Bull himself, E. L. Miller, operator, and Jack C. Bull at the extreme right, another son of the contractor.

A Section of the Highway Partially Graded

Know Your Truck Costs — II

By P. L. Sniffin

Last month it will be remembered, a table was given, containing certain figures of truck costs to be filled in from the daily records. The next important point on truck cost-keeping is to establish a system which will give the information to be filled on the summary.

Some contractors try to make too hard a job out of keeping truck costs, bringing in many ideas and methods with the hopes of getting additional or more precisely accurate information. The more we observe some of these systems, the more we are convinced that the most satisfactory system is the one which is, first of all, as simple and as fool-proof as it can be. The following is an outline which gives briefly the parts of the simplest kind of record system which any contractor may adapt to his own use.

1. *Driver's Daily Report.* Some method of recording the driver's work, vehicle expense, mileage, etc., from day to day, is obviously necessary. The Driver's Daily Report form usually works out very similar to a day-book in a bookkeeping system, and the items shown on it are later entered on summary records. Many concerns provide each driver with a pad of printed slips, one of which is turned in every day. On this, he records purchases of fuel, oil, etc., which are later checked with garage invoices. On this slip he also gives his performance record for the day. For example, at the end of a day's run, he inserts his speedometer reading. At each loading he inserts the number of tons in the proper space on the card. Finally, the number of round trips made in the day is frequently required. These items are usually checked with the report of the timekeeper on the job.

2. *Truck Day Sheet.* Now the driver's daily reports must be turned in and put together in some systematic manner. The Truck Day Sheet answers the purpose. There is one sheet per truck per month. The days of the month are ruled horizontally and the various items which are entered each day are ruled vertically. These items are merely a recapitulation of the driver's reports. At the bottom of the column, where it is summarized at the end of the month, provision is made for adding the repair charges which have been charged against the truck during the month (see point 4), and any other charges directly chargeable against that month, such as tire cost (according to mileage), driver's and helper's wages, garage rent, grease, etc. The result is that the final figure represents what it has cost to operate the vehicle during the month *with the exception* of fixed charges and those costs which are rightfully to be distributed over twelve months in the year. These latter costs are taken care of in this way: There is a space on the sheet set aside from everything else, where large current costs such as overhaul, painting, fines, etc., are inserted. These, together with the fixed charges (depreciation, interest, taxes and licenses) are usually carried over month to month and finally computed at the end of the year. Or they may be so arranged that the large current costs may be divided by twelve and the fixed charges per month added as they are. Thus, the owner has at least an approximate figure at the end of each month which he may use as his guide and compare with other months and other vehicles.

3. *Monthly Summary of Fleet.* This form is a very simple one to understand, it being a recapitulation of the Truck Day Sheets for all trucks in the fleet, made up at the end of each month. This also is computed on a monthly basis and finally recapitulated at the end of the year.

4. *Daily Repair, Stock Room and Maintenance Report.* In order to keep track of each vehicle's maintenance expense, some form is necessary which will supply the information to be inserted on the Truck Day Sheet for the items of repairs, overhauling, mechanic's time, washer's time, greaser's time, etc.

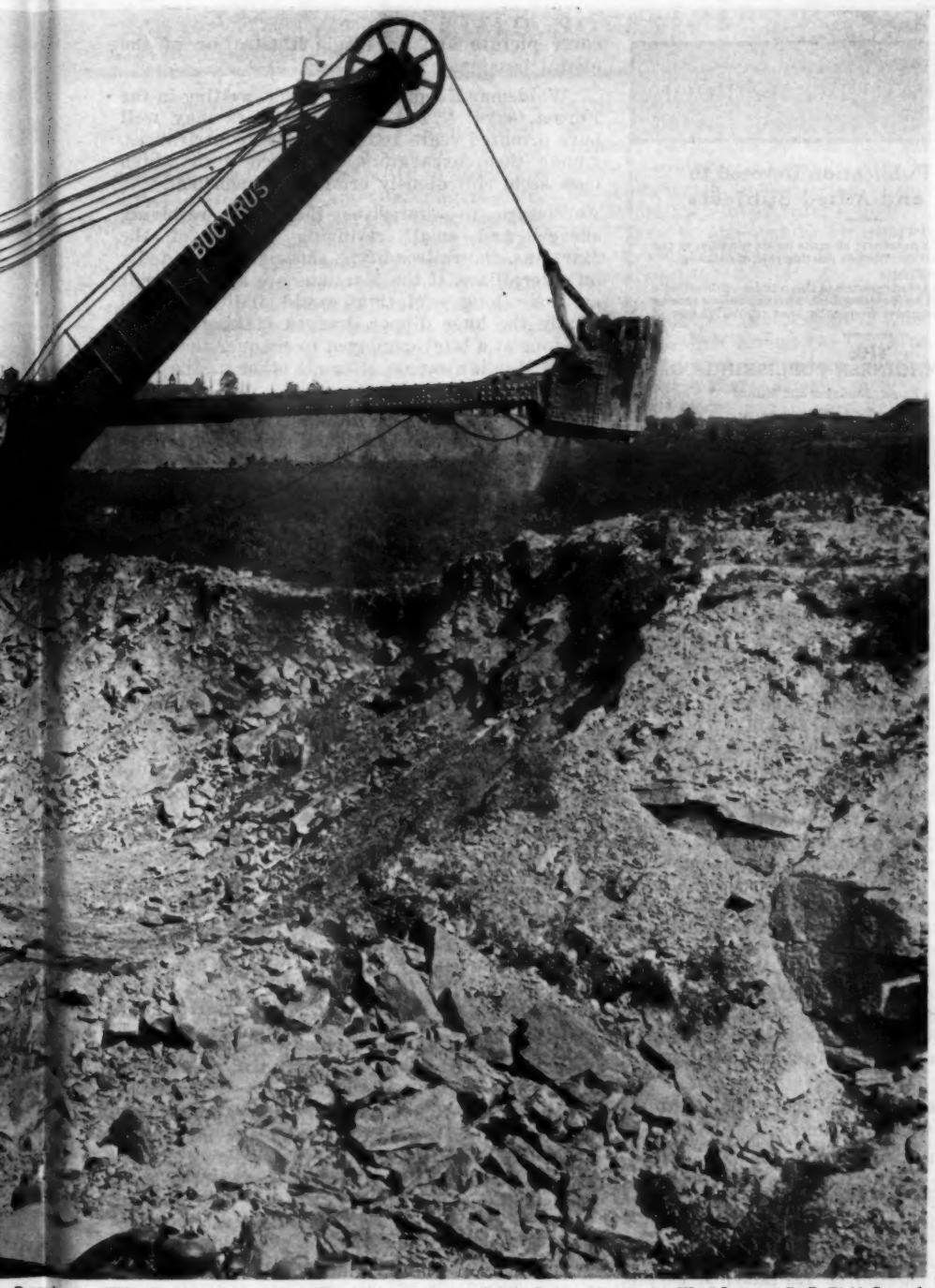
Regardless of whether inspections, adjustments, repairs, washing, greasing and oiling are done by drivers, helpers, employed mechanics or by an outside source, the point to remember is that all time charges, materials, parts or invoices should be charged individually against the vehicle for which the work was done.

When service such as this is done on the outside, it is a simple matter to request that invoices be itemized according to the vehicles and then entered on the Truck Day Sheet. Work done by the driver or helper is not usually charged against the vehicle excepting materials used, inasmuch as this is included in the item of wages.

The concern that operates its own service and garage facilities will need a separate bookkeeping system for this which will be very much the same as an accounting system for a business by itself. For our present purpose in this article, there is no need to complicate the subject by attempting to bring in the cost keeping requirements of a private garage.

The above suggestions on cost keeping provide, what is in the writer's opinion, the best skeleton outline of a truck cost-keeping system that can be offered in a general way, considering the great difference in conditions from one concern to another. An individual study based on this outline should be very productive in reaching the ideal system for the individual contractor's use.

The Cranberry Creek Coal Company's New Bucyrus 320-B Electric Shovel in heavy digging at their mine near Hazelton, Penn
The Cranberry Creek Coal Company has turned over this stripping operatio



, Pennsylvania. This shovel is the most powerful of this type yet produced. It is equipped with Ward-Leonard D. C. Field Control.
operation is J. Robert Bazley, well-known contractor of Pottsville, Pennsylvania.

The Excavating Engineer

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THE
EXCAVATING ENGINEER PUBLISHING CO.
Bradlee Van Brunt, Manager and Editor
South Milwaukee, Wisconsin
Printed in the U. S. A.

The Steam Shovels of the Planet Mars.*

Ever since Sciaparelli first announced to the world the discovery of the canals on Mars, there has been much popular speculation as to the existence of life on that planet. In recent years, Lowell and Pickering and Douglass and Morse and others have devoted considerable time to the study of this problem, and the canals have been mapped with great detail.

On August 22, 1924, Mars came nearer to the earth than it has come or will come in many years. Consequently most of the scientific and pseudo-scientific press has recently been devoting considerable space to the red planet.

The following facts are unquestioned: Twice in every Martian year a snowcap is found on one pole or the other of the planet. As this snowcap melts an area of blue water is seen about its edges. From this area of water the canals gradually appear to grow and spread out toward the equator, this phenomenon being caused by the growth of vegetation along the banks of the canals as the life-giving water gradually spreads from the poles. Some observers even report that they have seen evidences of cultivation under high cloth screens as is common in tobacco plantations on the earth.

If the canals of Mars are the work of intelligent beings, how were they dug?

Hugo Gernsback, writing in *Science and Invention* suggests that "The Martian uses an atomic or similar ray to perform work such as excavating, blasting, etc.," and he shows both a cover picture and an inside illustration of the quaint beast using such a ray.

Waldemar Kaempffert, however, writing in the *Forum*, says: "The people of Mars may well have invented years ago mechanical contrivances, among them excavators, compared with which ours seem ridiculously crude and inefficient."

Picture to yourselves the large revolving shovels and small revolving shovels of the Martians, the railroad-type shovels (undoubtedly on caterpillars, if the Martians are as intelligent as their long evolution would indicate), and finally the huge dipper dredges (taking twenty-five tons at a bite) employed to conquer the slides in the Martian canals after all other means have failed.

But in spite of the vaunted mental development of our neighbors in space, we cannot refrain from expressing a doubt that even they have not gone very far beyond the dredges that battled the Panama slides or the great steam and electric shovels that are today uncovering our vast deposits of coal and ore.

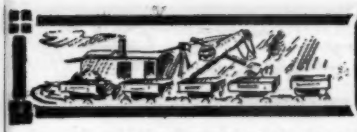
*It may interest our readers to know that the foregoing editorial was written especially for The Excavating Engineer by Ralph Milne Farley, the well-known author of pseudo-scientific phantasies, whose novel "The Radio Man" has recently appeared.

— and Our Center Page Spread

Even though he should permit himself to roam in the realm of imagination and speculation to his heart's content, it would be difficult for even the author of a pseudo-scientific fantasy to conjure up a picture more striking and awe inspiring than that displayed on the center page spread of this issue. We who live mid the marvels of radio and electricity are naturally somewhat numbed to the liberties modern engineers have the habit of taking with nature. To get the right proportion, we need only picture the attitude of mind, should Old King Cole or Mr. Shakespeare or even our own Rip Van Winkle, happen suddenly upon a pit over the hill with such a monster within, doing its stuff. With all due deference, we do not believe that even our neighbors in space have anything on us when it comes to the modern 8-yard revolving shovel, all the star-gazers, astronomers and pseudo-scientists in the world notwithstanding.

More than 300 years B.C. the Appian way was built by Claudius, the highway stretching more than 350 miles from the walls of Rome. This is believed to be the first record of a good roads movement in history.

The person who is able to overcome the worst in himself has managed to face the greatest problem that he will be called upon to encounter.



· FIELD NOTES ·

Feeling the Shovel's Mouth

Anybody who knows the first principles of managing horses realizes that a man cannot be a good driver unless he has the ability to "feel" his horse's mouth and thereby know instinctively his temper. This applies in a very striking manner to the operator of a steam shovel. Some time ago, we got a letter from Mr. Donald Francis McGrew, who for years was well known as a shovel man, but recently has made himself justly famous in the field of fiction. He expressed this idea to us in a very able manner. His remarks had special reference to the older types of shovels, a great many of which are in operation at the present time. He says: "A steam shovel runner must necessarily have a sense of touch and good judgment about all things to be a success at his business. I don't mean a starter and a stopper, I mean a steam shovel engineer. He must be cool, quick, nerveless and possessed with that judgment which, when he feels the danger through his fingers on the lever, allows him to act quicker than thought."

Unfortunately, the average shovel man feels that it is up to him to get out the dirt at any cost, or his boss will be on top of him, but a good shovel man will know exactly how far to go, and thus will, in the long run, get a great deal more out of his machine and load a great deal more material than the man that slams the shovel into hard digging without any thought of "feeling her mouth."

The delays due to repairs are very costly. The ability to follow this rule is really the difference between a good shovel man and a bad shovel man. The latter, it will be found, has a greater tendency to "run down" his machine than has the good shovel man.

When to Replace Solid Tires

By P. L. Sniffin

A point of great importance in using motor trucks with solid tires is that of knowing when the tires should be replaced. It should be remembered that at a certain point in the life of a solid tire it is more economical to replace that tire than to keep it on the truck.

Just where or when this point is reached, however, depends entirely upon the tire in question and the treatment it receives at the hands of the truck driver. Some tires will wear down evenly and smoothly while others will be cut, torn or bruised through the variance of such operating conditions as speed, load, driving and roads.

The economy of replacement is due to the fact that much damage is caused to the entire truck when it is run upon tires with insufficient body or resiliency. One authority on tire use says very aptly: "The life of a motor truck depends on two things. *First* — The useful life of the wearing parts such as bearings, gears, cylinder walls, pistons, etc. *Second* — The length of time the parts which are subjected to shock will operate before they break from fatigue. Any piece of steel that is abnormally stressed to any great extent will eventually fatigue and break by crystallization."

Any excavating engineer who has ever run a motor truck for any length of time with thinly worn solid tires, knows that such truck parts as the springs, axle centers, spindles, steering arms and rear axle shafts are seriously affected in this way. Unnecessary and very destructive strains are inflicted which in turn tend to shorten the life of the entire truck, if the operator fails to replace his tires when their life is gone.

It is generally recommended that a truck which is operated on cobblestones or rough pavements should have its tires replaced when they have worn down the rubber to within one inch of the steel base. Under the best conditions of smooth-surfaced roads, most authorities agree that a width of ¾ inch is the minimum required for proper cushioning. The condition of the rubber, of course, has much to do with determining the point at which a solid tire should be replaced since, if abused, a tire may be valueless from a standpoint of service even though it may be two or three inches in thickness.

It is a genuine temptation to keep the truck running on solid tires that have been worn too long to be useful, but it only takes one such experience as a rule to convince an operator that it is merely "Robbing Peter to Pay Paul."

How to Lift Boom Engine Crank Shaft

There are nearly as many methods of lifting the crank shaft of the boom engine as there are shovel engineers. Some, however, are simpler and quicker than others. An old-time shovel man tells us that the way he goes about it after having removed the caps from the crank shaft bearings, is to raise the dipper and chock the thrusting gear and pinion, then with a piece of chain or a good strong rope, get a hitch around the dipper handles and the crank shaft. Dropping the dipper consequently raises the crank shaft with the least possible trouble.

Some "Don'ts" for Shovel Operation

Don't start to swing until the dipper has cleared the bank — too much haste eventually will mean broken boom and dipper sticks.

Don't continue to pull the dipper through the bank after the dipper has become filled — you will waste power.

DEVICES YOU OUGHT · TO KNOW ABOUT ·

The Barber-Greene Type "U" Conveyor

The Barber-Greene Type "U" Conveyor, the letter "U" standing for Universal, is the result of many years' experience in the design and manufacture of various types of portable conveyors.

The machine is truly a universal machine for it has a wide range of use. It may be equipped with a 3-phase, 60-cycle, 220-volt, 3 h.p. motor, or with a Fuller and Johnson gasoline engine. It is well adapted for loading sand and gravel from pits into trucks or for loading from stock piles of any

The Barber-Greene Type "U" Conveyor

kind. In a great many cases it is being used for loading sand or gravel into a mixer.

The machine is simply designed, the parts are easily accessible. It is mounted on a two-wheel truck and the 4-inch channel frame provides strength with lightest possible weight. It is exceptionally reasonable in price and with an unusual number of features of design. It is rugged in construction and fool-proof in operation and adaptable to practically every type of operation.

Further information may be obtained by writing to the Barber-Greene Co., Aurora, Illinois.

The Miami Fordson Power Scraper

The Miami Fordson One-Man Power Scraper is a revelation for contractors having large amounts of dirt or sand to move. This ingenious machine has been manufactured by The Miami Trailer Company of Troy, Ohio, for the past year and at the present time they are increasing their production to handle the growing volume of business.

The scraper is designed exclusively for the Fordson Tractor. The power winch is of cast steel and constructed so that it bolts onto the rear axle housing with four stud bolts and clamps onto the rear axle of the tractor by means of a U-bolt. The gearing is driven by a friction clutch which power is taken from the belt pulley arm on the tractor to the revolving drum on the winch. To the drum is attached the $\frac{3}{8}$-inch cable which elevates the scoop to any desired position.

When loading, the bottom of the pan is almost parallel with the ground and remains in the same relative position until fully loaded. The operator drives forward at the same time holding the control lever at his right. The pan is instantly lowered to the desired depth. As soon as the pan is completely filled, the operator pushes forward on the control lever, thereby engaging the friction clutch. This causes the winch to operate, and by means of the cable elevates the front of the pan to about a 15-degree angle. The bottom of the pan at the rear is then about 9 inches from the ground.

The Miami Fordson One-Man Power Scraper is exactly what the name indicates. A power scraper operated by one man, loading, transporting and dumping by the tractor driver from the tractor driver's seat without stopping — a long continuous, day by day operation delivering every trip between 18 and 21 cubic feet rounded load of dirt.

The Miami Fordson Power Scraper

For moving dirt or sand in road construction; for city subdivision work; for stripping coal veins or gravel pits; for excavation; or for building embankments — this machine cannot be excelled. The low initial cost, low depreciation and low operating costs — makes it one of the most popular machines on the market today.

The tractor operates three times as fast as horses in this class of work. One man loads, drives

to the dump, unloads and spreads material and returns to the loading point without leaving the tractor seat. It all is accomplished with the one lever which operates the winch. The tractor power does all the work.

If a stone or root is struck while loading, the wheels of the tractor will spin around. The operator then raises the pan slightly, goes over the obstruction and immediately lowers it again on the other side to get a full load. In this manner the unit cannot become stalled for any reason. If the pan should get under a stone so large it cannot be raised, the entire unit can be backed to release it and then proceed as above outlined.

The scraper is built entirely of steel — well reinforced at every vital point. It is so constructed that it can be disconnected from the tractor in about three minutes. This leaves the tractor free to use for plowing, grading or trailer hauling. The power winch does not interfere with the regular hitch and may be left on the tractor permanently, as it does not operate except when the friction clutch is engaged by the control lever.

It has been proven many times by actual performance that a Miami Fordson One-Man Power Scraper Unit will replace four teams and six men. This saving is enormous even over a short period of thirty days. Further information may be obtained from the Miami Trailer Company, Troy, Ohio.

Barco Joints on Sand Suckers

Sand suckers used for dredging, etc., present quite a problem, as the pipes through which the sand is sucked into the dredge are very large, and it is necessary to provide flexibility in order to lower and raise the dredging connection to the proper level.

It is very essential in these sand suckers that the flexible connection provided should not only be entirely flexible, but should be very simple in construction, so that it may be readily repaired in case of necessity by the workmen operating the dredge, or sand sucker, without the necessity of bringing in outside mechanics.

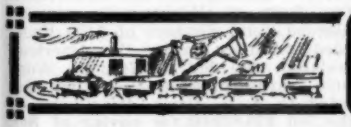
In addition to this, the flexible connection should be so designed that it will give the maximum amount of service with the minimum amount of attention.

Barco Joints have been found particularly suitable for this service, as once they are applied, they will last as long as any other part of the machinery, and they are absolutely tight under suction, as well as pressure. In addition to this, ordinary wear may be taken up from time to time by tightening the adjusting screws in the clamping ring, without taking the joint apart, or in any way interfering with the work of the machinery or the crew.

At long intervals the packing may be replaced by simply removing the clamping and adjusting rings, and applying a new supply of standard soft packing.

By using Barco Joints in this service it should not be necessary at any time to take the Joints apart, or interfere with the work of the suction dredge to repair the flexible joints. New packing may be put in between operations when necessary, and the only repairs, if any, that are required during the operations would be a slight tightening of the adjusting screws.

These joints are made in all standard pipe sizes from 4 inches to 40 inches inclusive. Further information may be obtained from the Barco Manufacturing Co., 1801 Winnemac Avenue, Chicago, Illinois.



SHOTS FROM THE FIRING LINE

New England Notes

This is E. G. Wentzell, "Shorty," as he is commonly called, the fireman of the 70-C Bucyrus owned by Winston & Co., Hope, Rhode Island, who have under way the construction of a large dam for the City of Providence. Shorty tells us the work is progressing nicely.

ROBERT H. NEWELL

Robert H. Newell of the R. H. Newell Company, Inc., died at his home in Uxbridge, Massachusetts, on Sunday, August 10th. He had been in ill health for some time and had been confined to his bed since the first of August. Typhoid fever developed and was the immediate cause of his death.

Mr. Newell was born at Uxbridge, Massachusetts, June 1, 1869, and was educated in the public schools there and at the Bryant and Stratton Commercial School in Boston. At the age of 18 he went to work for the Newell & Snowling Construction Company and remained with that company until its dissolution. During this period he covered, in connection with that company's business, the territory from Moosehead Lake to Water-

bury, Connecticut, and from Wallaston, Massachusetts to the Catskills.

In 1911 he organized with his brother E. Raymond Newell, The R. H. Newell Company, Inc. Under his direction that company built many highways in Maine, New Hampshire, Massachusetts and Rhode Island, as well as the Filtration Plant at Fitchburg, Massachusetts, and the enlargement of the Framingham filtration area.

Mr. Newell is survived by his wife (Ida) and three children and four brothers.

Northwestern States Notes

BY A. R. HANCE, PORTLAND, OREGON

Expenditures totaling $385,400 of forest highway funds for the construction of highways within or adjacent to the national forests in Oregon have been approved by the Secretary of Agriculture. Four and one-half miles of road on the Alsea River Highway, which serves the Siuslaw National Forest in Lincoln County, will take $18,000 of the Federal funds and $30,000 State and County money. To eliminate a dangerous section of the Applegate Highway in the Mule Hill District of the Crater National Forest, one mile of road will be constructed at a cost of $22,000. The Federal Government will expend $120,000 and the State the same amount for surfacing and grading about 20 miles of the Dalles-California Highway in the Deschutes National Forest. In this same forest, the McKenzie Road will be extended eight miles with $25,000 Federal money and $25,000 of the State. Surfacing of the Mount Hood Loop Highway in the Mount Hood National Forest will be completed with $12,500 from both agencies. Projects on the Roosevelt Highway to be attempted are 10 miles between the Town of Hauser and the line between Douglas and Coos Counties. The sum of $200,000 is to be divided between the National Government and the State. Within the Siskiyou National Forest four miles of the Roosevelt Highway between Mussels Creek and Euchre Creek will be reconstructed at a cost of $146,000, of which the Federal Government will furnish $58,000 and the State $88,000. Maintenance of the National Forest Highways already constructed will cost the Government $34,900 and the State $7,200.

Large road jobs for Idaho approved: South Fork Highway project, comprising immediate construction of three and a half miles of the South Fork Road, up the river from the terminus of the present road at Castle Creek, within the Nezperce National Forest, has just been approved by the Federal Government, according to advices from Washington. The project calls for expenditure of $75,000 of forest road funds on the South Fork during the present year. The Government has also approved building six miles of the Lolo Highway in the Selway National Forest, at a cost of $100,000.

Montana road contract awarded: Stevens Bros. of St. Paul, were awarded the contract at $53,094 for construction of a road in Glacier National Park. This job is six miles of highway on the Transmountain Road west from Lake St. Mary's. The one bid for the construction of two additional miles of the same road east from Lake McDonald was rejected as too high.

Morrison-Knudsen Company of Boise, Idaho, were recently awarded the contract for the grading of 14.2 miles in Snohomish County. Their bid was $224,774.81.

Pacific Coast News

BY P. H. BIRCKHEAD, SAN FRANCISCO, CALIFORNIA

W. M. Young is now operating the Clarke Rock & Gravel Corporation's Bucyrus 30-B steam shovel. Mr. Johnson is superintendent of this plant.

Plans are being prepared by Consulting Engineer W. A. Farish, for the rebuilding of the Walnut Grove Dam to irrigate lands between the Hassayampa River and the Agua Fria River, near Wickenburg, Arizona. A tract of land embracing about 18,000 acres will be opened to colonists under the Carey Act. Estimated cost of the dam is $3,000,000.

A report has been prepared by Sanitary Engineer C. G. Gillespie on sewage disposal at San Diego, and has been presented to the City Council. The report recommends the construction of an outfall sewer to the Bay.

Contract awarded to Downer & Mero, 1 Twentieth Street, Richmond, Contra Costa County, California, who bid $130,759.00 for grading and surfacing 23,436 lineal feet, 24 feet wide, in Coconino County, Arizona, being the Flagstaff-Angell Highway, bids were received by the Bureau of Public Roads, United States Department of Agriculture, Phoenix, Arizona. For list of unit bids submitted and quantities of work involved, refer to our issue of July 10th.

Bids were received as follows by the Board of Harbor Commissioners, Los Angeles, for dredging about 540,000 cubic yards material at Berth 228: San Francisco Bridge Co., Nevada Bank Building, San Francisco, $0.125 per yard; United Dredging Co., Long Beach, $0.1438 per yard; Western Dredging Co., $0.153 per yard; Los Angeles Dredging Co., $0.1824 per yard.

The contract was awarded to the San Francisco Bridge Co., Nevada Bank Building, San Francisco, who bid $67,500.00 for dredging about 540,000 cubic yards of material at Berth 228.

Contracts were awarded as follows by the Highway Commission to D. A. Foley Co., Grant Building, Los Angeles, for 5.2 miles Bay Shore Highway, San Mateo County, Alt. D—60-foot roadway, material hauled in borrow from Belle Island. Bid of $298,610.00. Structures Alt. F, bid $45,390.00.

Work is being started by the Imperial Irrigation District, at El Centro, Imperial County, on the construction of 88 miles of main outlet drains, involving 4,147,000 cubic yards earthwork. Work will be done by day labor, under supervision of Chief Engineer Ray Carberry.

Contracts were awarded as follows by the Board of Supervisors of San Mateo County, for the improvement of County Highways: (1) Grading 5129 feet from Black Mountain Water Co., Town of Hillsborough, westerly to the Skyline Boulevard, total distance of 5129 lineal feet, contract awarded to Kaiser Paving Co., American Bank Building, Oakland, who bid $17,749.00. Work involves 24,000 cubic yards excavation, unclassified. (2) Contract awarded to A. J. Grier, 480 Chetwood Street, Oakland, who bid $24,899.00 for paving of San Bruno Road from Mission Road, in Daly City, to Market Street in Colma, paving with waterbound macadam. For complete list of bids submitted and quantities of work involved, refer to our issue of August 4th. Geo. Kneese is County Surveyor.

Preliminary plans have been prepared by City Manager C. H. Hickok and City Engineer Burnett Hamilton for the construction of extensive harbor facilities and industrial sites between Bay Farm Island and Alameda. It is proposed to construct a 4-mile riprap wall, a 100-foot roadway on top of the wall and to dredge a channel 500 feet wide and 30 feet deep along the wall for shipping. Dredged material would be used to fill in the low lands for industrial sites. Total estimated cost $3,125,000. A meeting of the City Council will be held in a few weeks to discuss the project further.

UMI

Southern States News

BY C. N. BALLENTINE AND W. W. WHORLEY

We are enclosing herewith clipping about the Highway Letting in Nashville, Tennessee, on August 8th.

Costello Brothers Company are making good progress on their Central of Georgia contract near Dadeville, Alabama. Mr. Con Costello is in charge of operations. John Stallings is handling a Marion 60.

John Kreis is making a big hole in the ground at Jacksons Gap, where he is taking out a heavy summit cut through shale and solid rock. Luther Weisgarbe is piloting a Marion 60 through this cut. Frank Walter is craning for him, assisted by Amos Human at the back end.

The O'Brien Construction Company are making things hum near Good Water. Mr. H. R. Jones is handling a Bucyrus 14-B on this work.

D. E. White is operating a Bucyrus 14-B for the Tennessee Coal & Iron Company at Fairfield, Alabama.

H. N. Donahoo, Birmingham, Alabama, was recently awarded a nice section of road work between Jasper and Oakman, Alabama.

Fred Bradshaw is pulling the levers on an Erie B for the Dwight P. Robertson Company on their Finley yard job near Birmingham.

J. D. Morris is handling a Marion 21 for Paul Millsaps at Eastern, Tennessee.

Rogers, Dennison & Brown, Memphis, Tennessee, were recently awarded a nice piece of levee work by the Vicksburg office of the Mississippi River Commission.

George W. Turner has been awarded a nice piece of street work in Memphis, Tennessee.

St. Louis Items

BY A. B. KOENIG

E. B. Styles Contracting Co., Chicago, were awarded the contract for bridges on the New Illinois Central double-track work between Belleville and Pinckneyville, Illinois.

Only one bid was received by Major C. C. Gee, in charge of government revetment work on the Missouri River, for the construction of retards at Labaddie, Missouri. The bid was submitted by Woods Brothers Construction Co. The total cost of the work will be $54,000, one-fourth of which will be borne by the Government. The remainder will be paid for by the Labaddie Bottoms River Protection District.

McNerney & Haller were awarded contract for grading four miles of highway and one bridge west of Butler, Missouri.

Frank McCaughey motored down from Chicago with his wife. He saw the sights here during the hottest weather we have had this year. He returned to Chicago in the evening. Too hot to travel in day time. Come again a little later on when the weather is cooler.

At a letting for the construction of the new $1,000,000 bond issue market, held by the Board of Public Service, July 24th, the low bid was entered by the Fruin-Colnon Construction Co. Its offer was $765,000, which is $85,000 under the estimate made by the city engineers at the time the bond issue items were fixed. Nine concerns bid for the job, most of them ranging below the city's estimate. They are: Murch Bros. Construction Co. with a bid of $777,623; Selden Breck Construction Co., $815,368; Humes-Deal Company, $798,923; McCormack-Coombs Construction Co., $765,300; James Stewart & Co., $833,900; E. A. Steininger Construction Co., $848,731; H. O. Hirsch & Co., $809,692, and Pelligreen Construction & Investment Co., $885,262. The building is to be constructed of brick, three stories high, the two upper floors to be used as a garage. This contract calls for construction only, and none of the furnishings necessary to the market. It will be situated on the site of the old Union Market, between Broadway and Sixth Street and Morgan Street and Lucas Avenue.

The Industrial Track Construction Co. have increased forces on their Wabash track-laying and surfacing jobs. H. Billman, President, and J. McCullough, Secretary, of this company, have been two of the busiest men in this part of the country lately.

J. Clyde Evans, Springfield contractor, was awarded the contract for construction of the new Illinois Power Building at Fourth Street and Capitol Avenue, Springfield, Illinois.

The bid of Rogers, Denison & Brown of Memphis, at 61.9 cents per cubic yard for approximately 350,000 cubic yards for levee across Eagle Pass Lake of the Brunswick extension, was accepted when the bids were opened at Vicksburg, Mississippi, in the office of Major R. P. Howell, engineer, in charge of the Third Mississippi River District, August 5th. Seventy per cent of the work has to be completed by January 1, 1925, and the remainder by January 1, 1926. There were four other bidders on this particular job.

Other contracts awarded were: Mississippi Refuge, 93,000 cubic yards at 41 cents per cubic yard to Elkas & Weathers, Greenville, Mississippi.

Lower Luca, Arkansas, 135,000 cubic yards, at 32.7 cents per cubic yard, to Roach & Stansell Co., Inc., Memphis, Tennessee; Chicora, new levee, 600,000 cubic yards at 32.7 cents per cubic yard to Roach & Stansell Co., Inc., Memphis, Tennessee.

Ashton, Louisiana, new levee, 135,000 cubic yards at 31.5 cents per cubic yard, to J. W. Noble, Fayette, Mississippi. Wilson Point levee, 100,000 cubic yards, all bids rejected. Hollybrook, 225,000 cubic yards, all bids rejected. The bids for both of these projects were rejected on account of being too high. Henderson, 400,000 cubic yards at 32.4 cents per cubic yard to Will Owens & Co., Jackson, Mississippi.

Blythe Bros. & Shugart, Logan, Illinois, have 10,000 yards of grading suitable for a small car and shovel outfit to let near New Athens, Illinois, on the Illinois Central Railroad. Free transportation for labor and outfits over the Illinois Central Railroad.

The St. Louis Structural Steel Co. was awarded a contract for the construction of a bridge at Piney Creek, Jackson County, midway between Clarksville and Russellville, Arkansas, on the Little Rock-Fort Smith Highway. W. D. Banker of Memphis was awarded a contract for the construction of four miles of gravel road west of Marianna in Lee County.

The Queal Construction Co. of Neosho, Missouri, were awarded contract for putting in a sewerage system at Mayfield, Kentucky. The contract calls for an expenditure of $180,000.

Lowrance Bros. & Co. were awarded over a million yards of Government levee work in the lower St. Francis District. Their bid was $459,580.00.

Rodgers Brothers & Co. were awarded contract for 480,000 yards of Government levee work in the White River Levee District. Their bid was $188,500.00.

The City Council of Springfield, Illinois, awarded the following contracts for public improvements: Jackson Street pavement, Eleventh Street to Twenty-second Street, John E. Bretc, $77,735.00; pavement of Columbia Avenue, Fayette Avenue to Lawrence Avenue, and Lawrence Avenue, Columbia Avenue to Park Avenue, J. O. Patteson Co., $17,107.00; Reisch Street water main, Yates Avenue to Oak Ridge Avenue, Fred R. Burke, $1,476.00; Rutledge Street water main, Yates Avenue to Oak Ridge Avenue, Fred R. Burke, $1,590.00; Renfro Street water main, South Street to Ash Street, C. W. Buttrick Co., $1,402.00; Ledlie Avenue water main, Yates Avenue to Oak Ridge Avenue, Fred R. Burke, $1,537.00; Patton Avenue water main, Calhoun Avenue to Dorian Avenue, C. W. Buttrick Co., $1,357.50.

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Geo. B. Massey, Vice President
1216 First National Bank Bldg.
CHICAGO

A contract for nine miles of brick pavement from a point a mile south of Shawnee to the City limits of Olathe, Kansas, was awarded by the Johnson County Commissioners to Cook & Stucker, Ottawa, Kansas. The contract price was $373,862.72. The nine-mile stretch will connect with another section of the road already under contract, running to the Wyandotte County line. When both projects are completed the road will connect Olathe and Kansas City with a paved highway. Five bids were submitted. Two specified brick and three concrete. The low bidder on concrete was the Harrison Construction Co. of Kansas City. Although lower than the brick bid of the Cook & Stucker Company, the commissioners felt that in specifying brick they were making a better investment.

Contractors when in want of labor or work for their outfits write or wire Koenig Labor Agency, 612 Walnut Street, St. Louis, Missouri, or 501 Delaware Street, Kansas City, Missouri.

Canada

Winnipeg and Vicinity

BY F. X. AMOSS

Mr. Duncan McArthur, one of the old-time contractors in Western Canada, is a welcome visitor to Winnipeg this month. He has been living in Texas for the past seven or eight years and tells us the Bucyrus 20-B machines now working there are the finest excavating equipment he has ever seen.

Messrs. Carter-Halls-Aldinger Company of Winnipeg, are opening a branch in Vancouver. This office will be managed by Mr. John C. Weston, who has been in charge of several large contracts for this firm in British Columbia.

TWIN CITY ENGINES

BUILT TO DO THE WORK

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Manufactured in sizes 35 to 140 horsepower. Literature and specifications gladly sent upon request.

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Various improvements have been made to the Draper Plant at Waterways, Alberta, and it is expected that the early shipment of large quantities of tar sands can be made.

Mr. D. A. McIntyre, Inspector of Dredges, for the Dominion Government, has returned from a visit to the northern part of the Province. There are two dredges in operation this season on Lake Winnipeg, one at the northern end and one at the mouth of the Red River.

Mr. A. J. Macbeth, who has returned from a sojourn in the States, is going out with a Bucyrus 18-B to Lake Louise, British Columbia, for the Carter-Halls-Aldinger Company.

Mr. Malcolm Inglis, manager of the Public Utilities Commission at Port Arthur, has resigned to become Assistant to the Vice-President of the Brazilian Traction, Light & Power Company.

The Ontario Government has sent out an engineering party to survey and report upon the incompleted section of the Transcanada Highway lying between Sault Ste. Marie and Port Arthur.

Winnipeg firms were successful bidders for the clearing and grading of 57½ miles of branch lines in Western Canada of the Canadian National Railways, it was announced recently at the Union Station, Winnipeg. The work in all cases will be completed this year.

The successful bidders and the construction they will undertake are: Dunblane, southeast — Dutton, Mannic & Wickstrand; Hanna-Worden Branch — Boyd's Ltd., and A. C. Bryson & Son; Loverna, west and Peebles, south — J. T. Hargrave & Co., Ltd.; six miles of grading on the Prince Albert northeast line will be finished by Hett & Sibbald, Winnipeg, as part of their previous contract for work on this line.

On the Dunblane southeast line track will probably be laid on the 14 miles to the South Saskatchewan river crossing, so material may be taken in for the bridge construction. This crossing will be one of the longest bridges on the Canadian National system. Clearing and grading work to be undertaken this year on the branches named includes 15 miles on the Hanna-Worden line, 20 miles Loverna, west, 2½ miles on Peebles, south.

Track laying on the Gravelbourg extension it is expected will be finished this week and the gang will be moved to the Peebles branch. A gang is now building material yards at the Ste. Rose du Lac-Rorkton line, which will be started when the track is down on the Peebles line.

Montreal and Vicinity

BY J. M. WARD

The contract for sewer construction in East York Township has been awarded to H. M. Scott Construction Company of Toronto, and in this way they are making their debut to the engineering community of this district. We welcome our old friend Mr. Scott in his new business. He brings a wealth of experience in the construction field which should spell success.

The Nelson River Construction Company are making good progress in their sewer contract at Stanford Township, Niagara Falls. Their headquarters are at Winnipeg. They are by no means the first Western contractors to invade this territory and such interchange of work east and west has always done good in the general construction field. We welcome them and hope they have come to stay.

As we go to press, tenders are called for to separate railway grade on Bloor Street West, which involves the City of Toronto and railway companies. Quite a lot of such separation work is in prospect in Toronto suburbs.

Roger Miller & Sons of Toronto have secured the contract for the improvement on The Canadian National Electric Railway to the City of Niagara Falls and work on the new terminal at that point. The work commenced late in July and is now well in progress.

The greatest event in railway construction work is the approval of the Toronto Viaduct by the Canadian Government and its acceptance by the two railroads involved. This will be the biggest single piece of construction work undertaken in these parts since the Kaiser invaded Belgium. The financing has yet to be arranged for the twenty-eight and a half million dollars estimated, the Dominion Government, the railroads, and the City of Toronto all contributing thereto. One of the greatest advantages will be the use of the new Union Station which has stood idle for seven years. It is not likely that much work can be done on the project until 1925.

For Sale — BUCYRUS SHOVELS
Railroad Type — Standard Gauge

70 Ton	95 Ton
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TRADE NOTES

Eighty employees of The Dorr Company, Engineers, of Denver, Colorado, with an office in New York City, have been insured under a group plan for amounts ranging from $1,000 to $5,000, for a total of $190,000.

The policy, which was issued by the Metropolitan Life Insurance Company, provides that junior engineers may obtain $1,000; senior engineers, $2,000; assistant department heads, $3,000; heads of departments, $4,000; and officers and executives, $5,000 insurance policies.

Written on a contributory basis, the insured employee and the company will jointly pay the premiums.

The Metropolitan offers several service advantages, supplementary to the policy. One of these is the periodical distribution of health literature. Another is its free graduate nursing service extended to certain classes of policyholders.

The Chicago Pneumatic Tool Company announces the transfer of Mr. Ross Watson, formerly District Manager of the Cleveland Branch Office of this company, to the District Managership of the Minneapolis Branch to succeed Mr. D. M. Wesbrook, now General Manager of the Canadian Pneumatic Tool Company. Other recent changes include the transfer of Mr. L. J. Westenhaver, from the Pittsburgh Office to Cleveland as District Manager of that Branch and Mr. E. C. Stroup, Compressor Engineer in the Boston territory, has been moved to the Pittsburgh District.

Never "coast" your truck down a hill. By this we mean do not descend a hill with a truck, loaded or empty, with your clutch disengaged.

By leaving your clutch engaged your motor assists in braking the truck and also relieves the brakes themselves of part of the strain and helps keep them from "burning." It is also better not to shut off the ignition because if you do so on a long hill, the excess gas which accumulates during the descent may cause an explosion of sufficient force to ruin your muffler when the ignition is turned on again at the bottom of the hill. In addition it causes the carbon to form quickly.

"Coasting," in many states, is against the law because it is conducive to traffic accidents, due to the fact that a loaded truck may burn out its brakes or attain such a speed as to get beyond control on a steep hill. In addition, re-engaging the clutch with the truck traveling at high speed can do almost irreparable damage to a truck. Most motor truck engines are governed at a specified speed. If a truck travelling down a hill with clutch disengaged attains a speed of 35 to 40 miles per hour and its engine is governed at say 25 miles per hour, imagine what will happen if the clutch is re-engaged with truck and engine running at these respective speeds.

If the load is sufficiently heavy the entire driving mechanism may be torn out of the truck, or the least that may happen is the ruining of one of the propelling units.

Care should be taken in gear shifting. A green driver should in all cases be "broken in" by an experienced one until he "knows" his gear shift almost instinctively.

Last of all, the driver should "keep up the momentum" of his truck in heavy going. He should never let the speed of his truck diminish to the "Laboring" point before he shifts. The purpose of the transmission is to provide locomotion under all road conditions and failure to "shift" when it is necessary causes unnecessary strain.

—F. A. Whitten, Chief Engineer,
General Motors Truck Co.

The Clark Car Company, Pittsburgh, Pennsylvania, manufacturers of railway air dump cars, have appointed Mr. Theodore B. Counselman as Western Representative, with headquarters at 122 South Michigan Avenue, Chicago.

Mr. H. L. Woolfenden has joined the Scott Valve Manufacturing Company of Detroit, Michigan, and will have charge of Sales Promotion.

Mr. Woolfenden is a graduate mechanical and electrical engineer, having received both degrees from the University of Michigan.

After several years spent as a consulting engineer in Detroit, he went to Denver in 1901 and engaged in engineering and contracting. Later becoming associated with the Allis-Chalmers Manufacturing Company. Mr. Woolfenden, while district manager at Denver, had charge of all sales and engineering work in the Rocky Mountain District.

Sr. Fermin Leon and Sr. Hector Vigil, highway engineers from the Republic of Chile, who have been in the United States making a study of highways and construction methods, recently inspected highways in the vicinity of San Francisco and Los Angeles under the guidance of a special representative of R. M. Morton, chief engineer of the California Highway Commission.

It has been recently announced that Frank B. Smith, Central Sales Representative of the Bucyrus Company, South Milwaukee, Wisconsin, has recently been admitted to The American Society of Civil Engineers.

Mr. Smith has had a wide range of experience in civil engineering work and has been identified with a great many large construction jobs throughout the United States.

Mr. Smith has been with the Chicago Office of the Bucyrus Company for two years.

REVIEW OF BOOKS and CATALOGS

We shall be glad to review, in this column, such books and catalogs as are sent to us.

Booklet on Westinghouse Insulating Fabrics and Papers

The Westinghouse Electric and Manufacturing Company, Pittsburgh, Pennsylvania, has recently published a new booklet, known as FOLDER 4532-A, dealing with Westinghouse Fabrics and Papers for insulating purposes. All the forms of treated and untreated fabrics, papers, sleeving, tapes, cord and thread manufactured by the company are fully described in the booklet and their principal applications given.

The materials described in this folder are those used in the manufacture of Westinghouse electrical apparatus and made available to the general trade. The booklet is of interest to all users of insulating material in any of its various forms.

The *Union Iron Works* has recently issued a very interesting booklet, describing in detail the design and construction of their new Union Universal Boiler of the self-contained return flue type. The booklet shows interior and exterior views as well as sections through the boiler, and a table gives data on all dimensions of importance. The Universal Boiler is made in sizes from 25 to 150 h.p. and is particularly adapted to installations where only small floor space is available. Copies may be had by addressing the *Union Iron Works, Erie, Pa.*

The Barco Manufacturing Company have recently issued their CATALOG No. 200, describing and illustrating Barco Flexible Joints for steam, air and gasoline, water and other fluid for a flexible conveyor as required. The publication is beautifully illustrated with a number of half-tones showing the many ways to which Barco Joints may be used.

For those who are interested in running steam, air and water lines to steam shovels, road-building machinery, dredges, dragline excavators, mine drills, pumps, etc., this booklet would prove of interest. A copy of this may be obtained by writing to the above company at *1801-1815 Winnemac Avenue, Chicago, Illinois.*

A new booklet recently published by the *W. A. Jones Foundry & Machine Company, 4401 Roosevelt Road, Chicago,* has recently been distributed which describes and illustrates the many kinds of gears made from cast iron, cast steel, forgings, rawhide, bakelite, including giant gears to small pinions, spur-gear speed reducers, enclosed worm-gear drives, etc., all of which are manufactured by the above company.

Westinghouse Revises Booklet of Wiring Tables and Illumination Data

The third edition of "HANDY WIRING TABLES AND ILLUMINATING DATA" has been recently revised and published by the *Westinghouse Electric and Manufacturing Company, Pittsburgh, Pennsylvania.* This 52-page booklet contains detailed directions for accurately laying out the wiring for an industrial or commercial lighting system, and, for this reason, is of particular interest to architects, builders, electricians and electrical dealers. An interesting feature of the publication is a table of the present standards of desirable illumination for various classes of service, giving the range of foot-candles most desirable for illumination in practically every branch of industry where artificial light is used.

The Everhot Manufacturing Company, Maywood, Illinois, have sent out broadsides on their branding outfit recently put on the market. Those who find it necessary to stamp, for identification, their camp equipment will find this of interest. The tool is also used as a soldering iron which doubles or triples the amount of soldering that can be done, and as a blow torch.

The Hercules Trailer Manufacturing Company, Los Angeles, have just published a new catalog covering heavy-duty trailer equipment of from 10 to 50 tons capacity, especially designed for handling heavy machinery such as small revolving shovels and draglines, steam rollers, mixers, trenchers and tractors. In addition to their catalog they have also published a folder on STANDARD 4-WHEEL TRAILERS AND 2-WHEEL POLE TRAILERS, the latter being extensively used by power and light corporations and for handling of oil-well casing and tools. They will be gladly sent upon request.

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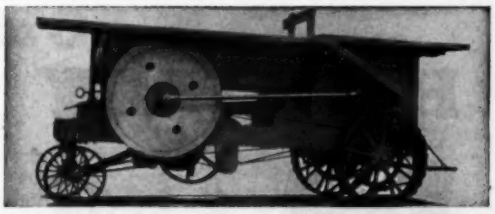

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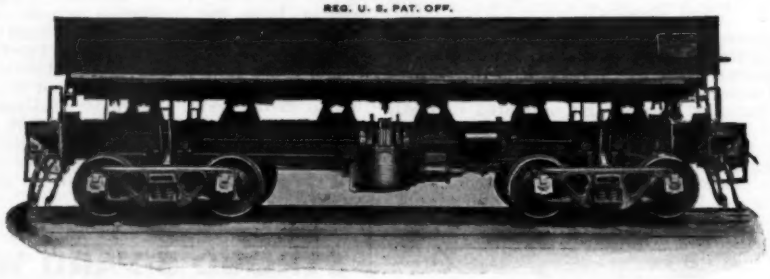

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Vol. 18 **MILWAUKEE, OCTOBER 1924** **No. 10**

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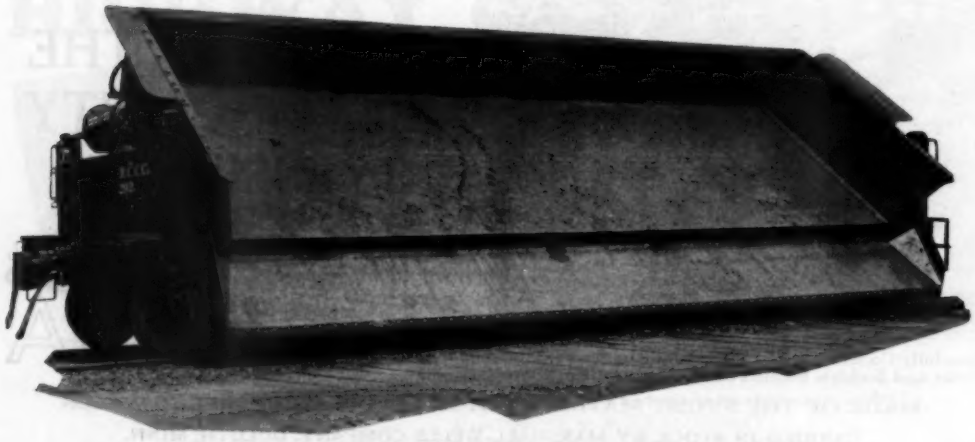

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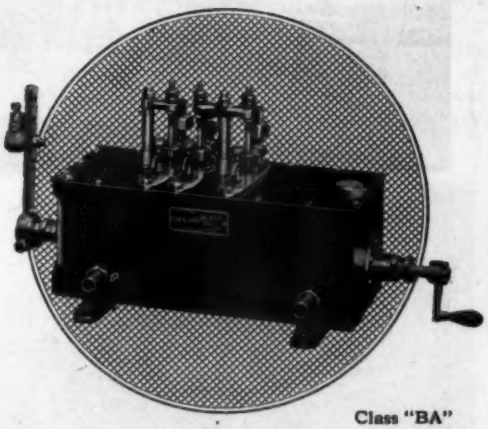

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View of Crushing Plant at the Stone Quarry

The Bucyrus 50-B Steam Shovel Operating in the Gravel Pit

Views of the Waukesha Lime & Stone Company's Operations at Waukesha, Wisconsin